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The Nature and Function of Educational Measurements

S. A. COURTIS, *Director of Instruction, Teacher Training and Research, Detroit, Mich., Public Schools*

My presence on this platform makes a few words of explanation necessary. I am not a music teacher. My musical training has been sadly neglected. My musical I. Q. is so low I should hate to have it put on record for public display. I come to you this morning as a "yardstick" man, pure and simple, to talk about tests and measurements.

Now I know from past experiences that to say "Tests and measurement" to most music teachers, and to exhibit a measurement man, is like waving a red rag before a bull. It is a stimulus to violent actions and brain storms.

Such teachers feel that the most significant, the most vital, elements in music are the intangible, the artistic, the aesthetic, the emotional elements. They believe that any attempt to measure music must of necessity deal only with the tangible, the objective products. They fear that measurement will lead to standardization, to routinization, to mechanization; that the spirit and soul of music will be crushed out of it and only empty husks and shells left. Accordingly they react toward measurement as violently as all of us do towards anything which we believe imperils the heart and life of the things we cherish most.

Therefore, let me hasten to set myself right with you. I too believe that the most valuable elements in music are the emotional elements. In fact, I am prepared to make a much more vigorous statement than that, for I do not believe music has any monopoly of the emotional. I believe that all standards of value in all levels and walks of life are derived from the emotional, the artistic elements, and I myself am prepared to resist vehemently,—violently, if necessary,—any movement which will crush or cramp the development of the proper emotional elements in arithmetic, in history, in typewriting, or any other school subject including music. It is emotion and emotion alone that makes life, all life, worth living and from my point of view, the basic problem in all educational endeavor is how to properly develop, organize and direct human emotions.

The curious thing about the situation is that it is just because I believe the emotional elements in education are so important that I believe in measurement. For I am told by many persons, including music teachers, that the intangible elements are much more complex, much more difficult to control than the objective and my own observations lead to the same conclusions. Consequently, since the outcome is so important, so vital, I dare not take any chances. I am unwilling to proceed by guess work. I want to be sure that I am doing the right thing, teaching by the best method. For there can be only one "best" way, and if I make a mistake on these vital matters, think how disastrous that mistake will be. Of this much I am sure: that not all the methods now in use are equally effective, and that the development of spiritual power does not occur effectively by chance. In other words, I am driven to measurement by the very same beliefs which lead many of you to oppose measurement. The difference between us lies, not in the things we value and work for, but solely in our opinion of the value of measurement as a means of achieving these ends. I am here, therefore, to let you look at measurement through a measurement man's eyes. I am going to discuss the nature and functions of measurement with you this morning and not music.

I shall ask you to begin by going a long way back—back to 1590, to be exact,—to the University of Pisa. If you had been a student in the University of Pisa in 1590 perhaps you would have known a brilliant young man who was

the talk of the campus that year and perhaps you might have been invited to join the little group of professors and students who gathered at the foot of the famous tower to see an experiment tried. For this young genius had been touched by the new spirit which at this time was beginning to make itself felt throughout Europe, and when he read in his text books, written by Aristotle two thousand years before, that "a five pound ball falls five times as fast as a one pound ball because it is five times as heavy," he conceived the idea of trying the experiment for the pleasure of seeing the thing happen.

What I want you to do this morning is to try to project yourself backwards into the middle ages and attempt to enter into the feelings of the little group who stood at the base of the tower while the young man climbed to the top. It was an uneasy group. Now that they were there, it seemed a foolish, an almost sacrilegious, quest on which they had come. Had not Aristotle, the master, said all that it was necessary to say on the subject? What excuse could there be for actually seeing the thing happen? Under the spell of the young man's personality and enthusiasm, it had seemed desirable to come. Now that they were there, they began to have misgivings. The whole affair was irregular to say the least. Had they been betrayed into doing something they were likely to regret?

The young man leaned over the rail at the top of the tower, held the two balls side by side for a moment and released them. Then a most amazing thing happened. In spite of what Aristotle had said, in spite of what had been believed for two thousand years, the very first time it was tried, the five pound ball did *not* fall five times as fast as the one pound ball in spite of the fact that it was five times as heavy. The two balls fell side by side and struck the ground together.

Now, what was that little group to say and do? What would you have done if you had been there? Well, the first thing they actually did was to hurry back to the University and make sure they had read Aristotle aright. Yes, there it was. "A five pound ball will fall five times as fast as a one pound ball because it is five times as heavy." There was no escaping the fact that Aristotle had said it and no fault was to be found with the logic. Yet they had seen the balls fall side by side.

For the people of that time, however, the situation presented no difficulties. Forced to choose between fact and the sayings of Aristotle, but one course of action was open to them. They preferred to stick by Aristotle, let the facts be what they might. I wonder if there are any music teachers in this audience who have preserved that same spirit, even to this day.

You know the sequel of the story. To explain the discrepancy between fact and theory, they resorted to the only weapon such people have,—personal abuse and vilification. "The young man is in league with the devil," they said, "and has bewitched our eyes." In less than a year, and in spite of his evident genius, they had driven him from the university by their persecution.

Gallileo, however, did not lose his interest in falling bodies. Instead, he spent many weary hours patiently rolling a marble down a slanting board and measuring the distance through which the marble rolled in a given time. Eventually he worked out the laws of falling bodies and Sir Isaac Newton, a little later, building on the foundation which Gallileo laid, formulated the general laws of motion upon which all of our modern engineering practice is based. So in the last analysis, we owe our railroads, our automobiles, our flying machines, yes, and the very light by which this picture is cast upon the screen, to the fact that Gallileo did not give up under criticism, but tested and measured until he had arrived at basic truth.

It took a long time for man to learn how to discover truth, but as soon as he had fully mastered the technique of the method, he extended its application

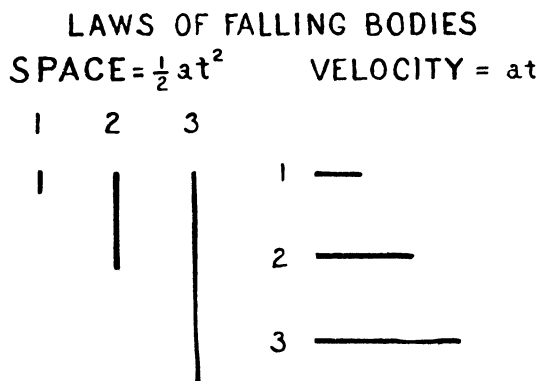


FIGURE 1

to one field of human activity after another. It transformed astrology to astronomy, alchemy to chemistry, gave us our modern industrial development and today is just beginning to accomplish its wonders in the fields of education and government.

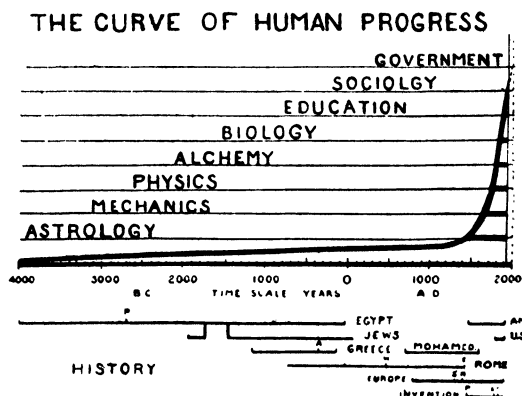


FIGURE 2

The point I want to make is that the scientific method is not on trial. Its power has been proved over and over again. The significance of the modern movements for the exact study of social conditions is that man has at last turned upon himself those methods of study which universally have proved effective wherever they have been employed.

Decidedly, the scientific method of arriving at truth is not on trial. If any of you is afraid of applying that method to music teaching, it can only be for one or both of two reasons. Either you are afraid the truth will not agree with your preconceived ideas, or you are conscious of your own inability to apply the method successfully. In any case, from my point of view, it is you who are on trial, not the scientific method. If you are afraid to face the truth, your claims and theories are entitled to no consideration whatever. If you are unwilling to make the effort and to pay the price in time and labor to become masters of so important a technique, then you should be judged traitors to your ideals. I accept the importance of music at your own evaluation, and I urge upon you to consider carefully whether or not in view of that importance, you can justify failure to make use of a means of betterment so rich in promise of desirable results.

"But," you will say to me, "have we not always had measurement in

education? Have we not given tests and marked our results?" To this I must answer "yes," but the tests have been so crude and our marking systems so poor that the results have been grossly misleading.

For instance, our writing supervisor found in the garret of our Board of Education a volume of specimens of handwriting prepared for the centennial exposition in 1876. Nearly every one of the five hundred samples looked like the writing in figure 3. The teachers of those days had their standards and

*Specimen of Albert Schloss:
Handwriting in 1876*

Gentlemen:-
Allow me to
introduce to your favorable consid-
eration my friend C. C. Harrison of Cin-
cinnati. Mr. Harrison visits your
City on business, the nature of which
he himself will explain and any at-
tention or courtesy you may be able
to extend to him, will be appreciat-
ed as personal favors to myself.
Yours very truly
Washington School Albert Schloss
Age 14

FIGURE 3

their marking and they secured results. Can you blame those same children if when today, as parents, they go into the schools and look at their children's writing, they praise the efficiency of teaching "in the good old days?" We have no such writing as that in our schools today, and *don't want it*. Why? Let me tell you the rest of the story.

Our writing supervisor traced the names of the children who wrote the samples in 1876 and found that many of them were still living in the city in 1919. Accordingly, she sent to all those she could locate the material they had written in 1876 and asked them to write it again in 1919. Take a good look at the writing of Albert Schloss in 1876 and then I will show you his writing in 1919.

*Specimen of Albert Schloss:
Handwriting in 1919.*

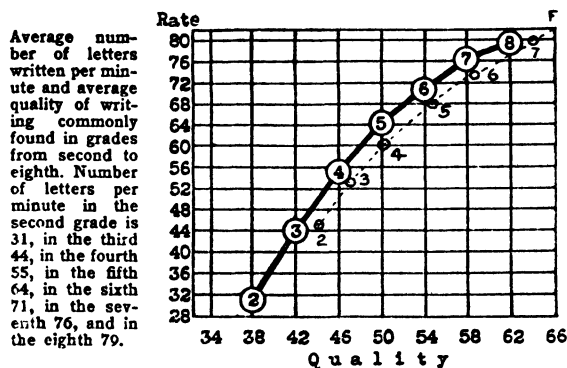
Gentlemen: Allow me to introduce
to your favorable consideration my
friend C. C. Huntington Fog of Cincinnati.
Mr. Huntington visits your
city on business, the nature of which
he will himself explain; and any
attention or courtesy you may be
able to extend to him, will be appre-
ciated as personal favors to myself.
Yours very truly
Albert Schloss

FIGURE 4

Do you see what has happened? The fine writing built up slowly and painfully in the school room was an impractical style and habit of writing. It broke

down just as soon as it was put to the test of use. It was built upon what the writing teachers of that day "thought" the children could do, but today we carefully measure the children and build up our standards on the basis of what children are actually able to do.

Here for instance are the standards formulated by Ayres on the basis of the measurement of thousands of children throughout the United States. It defines the aims of the writing teacher in definite and objective terms. For instance,



LEONARD P. AYRES

FIGURE 5

today in our writing tests, we measure rate of writing in terms of letters per minute and quality in terms of a rule for quality of handwriting which enables all teachers to express quality in exactly the same terms. We say, today a sixth grade class should write at the rate of 65 letters per minute with a quality of 50 on the Ayres scale.

Note that the standard curve provides for steady progress and a high final score.

When we measure schools in this objective fashion, however, we do not always find such curves. In the Cleveland survey, for example, the North Doan School has just such a curve, but the curve for Memorial School shows progress mainly in speed, while that for the Mt. Pleasant School shows progress mainly

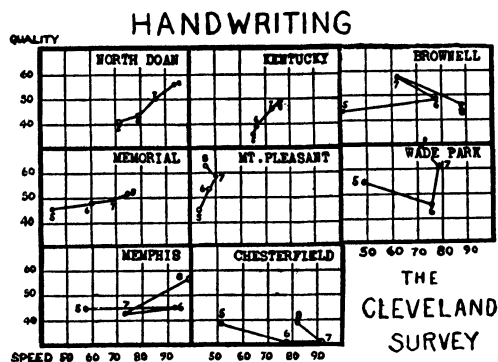


FIGURE 6

in accuracy. Neither represents desirable conditions. And what will you say about the Memphis School? I can tell you what is sometimes the explanation for such irregularities. The sixth grade teacher is one who has come in contact

with tests and because they are usually timed, has conceived altogether the wrong idea about speed. She thinks the proper thing to do is to get the children to "speed up." "Faster, children, faster," she is continually saying. "Show a little more speed," and she keeps them so keyed up to a nervous pitch that she does much more harm than good. However, the only speed that really counts is the speed that comes easily and naturally from perfectly functioning habits which are the results of long continued training by proper methods.

The teacher in the next room is just as wrong. She "doesn't believe in any of these new fangled ideas." When the children come from the speed room, she announces with grim determination written all over her face, "Now, none of that speed business goes in *my* room. When you write a paper for *me*, it must be *just so* or you will stay after school and write it over and over until you get it *just right*." In the figure, note the effect of such a policy.

(To be continued)

FINANCIAL REPORT OF THE EDITOR OF THE MUSIC SUPERVISORS' JOURNAL, 1921-1922

RECEIPTS

Book of Proceedings.....	23.50	
From Former Editor.....	\$ 69.94	
Bills Receivable from 1920-1921.....	253.30	
Journal Advertising—5 issues, 1921-1922.....	3,755.31	
Contributions	209.04	
Educational Council Reports.....	342.08	
Membership List (Baker-Taylor Co.).....	5.00	
	—————	\$4,658.17

EXPENDITURES

Printing:

Five issues of Journal.....	\$2,611.81	
Job Printing	233.70	
Educational Council Reports:		
No. 1	\$175.60	
No. 2	29.63	
	—————	205.23

Office Expenditures:

Secretary salary, supplies, telegrams, etc.....	508.03	
L. C. Smith & Bros. Typewriter.....	50.00	
Postage on 5 issues of Journal, Educational Council Re- ports, etc.	672.18	
Book of Proceedings.....	22.00	
	—————	\$4,302.95
Cash on hand	\$ 355.22	
Accounts receivable for 1921-1922 Advertising.....	456.25	
	—————	
Balance for year's business.....	\$ 811.57	

(Signed):

GEO. OSCAR BOWEN,
Editor.

Examined found correct.

PHILIP C. HAYDEN, Auditor.